

On the theory of spin-lattice...

27950  
S/185/60/005/004/009/021  
D274/D306

There are 2 tables and 10 references: 8 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Instytut fizyky AN USSR (Physics Institute AS Ukr SSR)

SUBMITTED: December 29, 1959

X

Card 7/7

ROYTSYN, O.B.

24,7100(1144, 1160, 1153)

27951  
S/185/60/005/004/010/021  
D274/D306

AUTHOR: Roytsyn, O.B.

TITLE: On the theory of spin-lattice relaxation of local electron centers in crystals (II)

PERIODICAL: Ukrayins'kyi fizychnyy zhurnal, v. 5, no. 4, 1960, 523-530

TEXT: Proceeding from the results of part I of the article (pp 509-521), the time of spin-lattice relaxation is calculated for a system with Hamiltonian

$$H = - (\mu H) + A(SI), \quad (1)$$

where  $\mu$  is the magnetic moment of the electron,  $I$  is the spin vector of  $p$  nuclei. The matrix elements of the spin operators are calculated. The expression obtained for the matrix elements is considerably simplified in certain particular cases. Thus, for strong magnetic fields ( $H \gg A/2\mu$ ), one obtains for the matrix element

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$$\left| (I_n S)_{F_z, S_z, I, \dots, I_{1q}, \dots}^{F_z, S_z, I, \dots, I_{1q}, \dots} \right| = \frac{1}{2} (I_{n+1} - i I_{n+1}^{F_z-1, I, \dots, I_{1q}, \dots}) \quad (6)$$

S is the vector of electron spin. The formulas of this section were adopted in part from H.F. Deygen and A.B. Roytsyn (Ref. 2: ZhTF, 36, 176, 1959). For H = 0, one obtains

$$(I_n S)_{F_z, F_z, I, \dots, I_{1q}, \dots}^{F_z, F_z, I, \dots, I_{1q}, \dots} = (I_n)_{I-1, \dots, I_{1q}, \dots}^{I, \dots, I_{1q}, \dots} \left| \frac{4I^2 - 1}{2} \right| \quad (8)$$

Further, particular models are considered. On F-centers (de Boer's model), a figure shows the possible directions of (grad <sup>2</sup> (r)). With large H, the energy spectrum has two systems of levels, each system consisting of 19 levels. As it is possible to investigate the hyperfine structure of F-centers, it is advantageous to calculate the transition probability between individual levels of the two systems. This probability

$$F_1' = \frac{3(2\mu H - 8,5A)(\nabla A_n)^2}{4\rho \hbar 2\pi} (n+1) \quad (12)$$

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If  $kT \gg (E_j - E_r)$ , the time of spin-lattice relaxation is of the same order in the absence of an external field as it is in the presence of a strong field. ( $E$  is an energy level). Further, paramagnetic resonance is considered of a silver atom introduced in a NaCl-type lattice. For large  $H$ , one obtains

$$(IS) \quad \begin{matrix} I=\frac{1}{2}, F_z=0, F=1 \\ I=\frac{1}{2}, F_z=0, F=0 \end{matrix} = \frac{1}{2}. \quad (14)$$

The time of spin-lattice relaxation is estimated for near-helium temperatures. First, an estimate is given for  $(\nabla \psi^2)_0$ . On the basis of this estimate, the relaxation time  $\tau$  is found to be  $0.3 \cdot 10^{-4}$  to  $0.3 \cdot 10^{-6}$ . On determination of spin-lattice relaxation time by the form of the absorption curve, the broadening of the absorption line is a result of a broadening  $\Delta E$  of energy levels. On the other hand,  $\Delta E$  is related to the limited lifetime of electrons in the quasi-stationary state. This lifetime is given by

$$\tau_2 \cong \frac{\hbar}{\Delta E} = \frac{1}{\Delta \omega}$$

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where  $\Delta\omega$  is the broadening of the line. In the case of silver in KCl, one obtains  $\Delta\omega = 2m$  (20)

where

$$m = \frac{kT}{12\rho\hbar^2} \left( \frac{1}{c_{\parallel}^2} + \frac{2}{c_{\perp}^2} \right) I_z^2 (\nabla A)_0^2 \quad (19)$$

In the present article, the relaxation time was computed on the assumption that the change in hyperfine structure is the main reason for spin transitions. The effect of spin-orbit interaction was neglected, as it is insignificant for F-centers in alkali-halide crystals. E.Y. Rashba has found that the character of the relaxation processes may be affected by the magnetic field of currents which arise as a result of charge oscillations. There are 2 figures, 2 tables and 9 references: 6 Soviet-bloc and 3 non-Soviet-bloc. The reference to the English-language publication reads as follows: A.M. Portis, Phys. Rev., 91, 1071, 1953.

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S/185/60/005/004/010/021  
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ASSOCIATION: Instytut fizyki AN USSR (Physics Institute AS  
UkrSSR)

SUBMITTED: December 29, 1959

Card 5/5

DEYGEN, M.F.; ROYTSIN, A.B.

Shape and temperature dependence of electron spin resonance lines of  
local electron centers in crystals. Zhur.eksp.i teor.fiz. 38 no.2:  
489-498 F '60. (MIRA 14:5)

1. Institut fiziki Akademii nauk Ukrainskoy SSR.  
(Nuclear magnetic resonance)

24.7000 (1143, 1144, 1559)

28103

S/181/61/003/009/037/039  
B108/B138

+

AUTHORS: Deygen, M. F., and Roytsin, A. B.

TITLE: A possibility to accomplish fieldless resonance in multilevel systems

PERIODICAL: Fizika tverdogo tela, v. 3, no. 9, 1961, 2876-2878

TEXT: In a previous paper the authors have shown the possibility of quantum transitions between hyperfine-structure levels in semiconductors in the absence of a magnetic field (Ref. 1: ZhETF, 36, 176, 1959). Resonance in such a system is termed fieldless resonance. When the parameters are properly chosen, such a system may be used as a two-level quantum amplifier. Unlike in Ref. 1, the authors study the possibility of allowed transitions between more than two levels. C. Slichter (Phys. Rev., 92, 479, 1955) gave an explanation suggesting that multiatomic quasimolecules are formed in crystals containing impurities. These quasimolecules are the cause that electron spin exchange interaction arises and, also without an external field, transitions become possible between the additional levels formed. A binary quasimolecule with nuclear spins  $I = 1/2$  is

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discussed. The Hamiltonian of such a system, which, for instance, may be a silicon-phosphorus quasimolecule, has the form  $\hat{H} = A(\vec{S}_1 \vec{I}_1 + \vec{S}_2 \vec{I}_2) + B(\vec{S}_1 \vec{S}_2)$ .

A denotes the hyperfine interaction constant between electron spins S and nuclear spins I, B is the exchange interaction constant of the two electrons. The system of energy levels  $E_i$  corresponding to this

Hamiltonian is the following:  $\epsilon_{1,2} = \frac{\beta}{4} \pm \frac{1}{2}$ ,  $\epsilon_{3,4} = -\frac{\beta}{4} \pm \frac{1}{2} \sqrt{1 + \beta^2}$ ,

$\epsilon_{5,6} = -\frac{1}{2}(1 + \frac{\beta}{2}) \pm \sqrt{1 - \frac{\beta}{2} + \frac{\beta^2}{4}}$ , where  $\beta = \frac{B}{A}$  and  $\epsilon_i = \frac{E_i}{A}$ . Each of the levels is characterized by the quantum number of the square sum of the spins  $(\vec{S}_1 + \vec{S}_2 + \vec{I}_1 + \vec{I}_2)^2 = (F)^2$ . The wave functions of each of the states, in zeroth approximation, are linear combinations of wave functions of the form  $\chi(S_{z1})\chi(S_{z2})\chi(I_{1z})\chi(I_{2z})$ , where the  $\chi$  are the spin functions.

The matrix elements of the transitions determining the selection rules and the line intensity may be found by substituting the above wave functions

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into the expression for the perturbation operator  $\hat{w}(t) = 2\mu_0(\hat{S}_{1z} + \hat{S}_{2z})H_z(t)$  due to an electromagnetic wave  $H(t)$  incident upon the crystal. The figure shows  $\epsilon_i$  versus  $\beta$ , the arrows indicating the allowed transitions. The levels  $\epsilon_6$ ,  $\epsilon_5$ ,  $\epsilon_1$ , and  $\epsilon_2$  are the most interesting ones in the problem under investigation. When the transition  $6 \rightarrow 1$  is used as "source", radiowaves of the frequency  $\Omega_{5 \rightarrow 1}$  will be generated and the signal of the radiowave with frequency  $\Omega_{1 \rightarrow 2}$  will be amplified. The constant  $B$  determining the frequency of the source is estimated. For elemental crystals  $B = -0.6 \frac{\mu e^4}{\hbar^2 \epsilon^2} \frac{1}{\epsilon^2}$ , where  $\epsilon$  is the dielectric constant of the crystal and  $\mu$  the effective mass of the band electron. The ground state energy of an impurity atom is  $E_0 = -0.5 \frac{\mu e^4}{\hbar^2 \epsilon^2} \frac{1}{\epsilon^2}$  so that  $B = 1.2 E_0$ . This holds in zeroth approximation with scalar effective mass of the electron. This relation permits estimating one of these quantities when the other

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is known. There are 1 figure and 4 references: 2 Soviet and 2 non-Soviet. The most recent reference to English-language publications reads as follows: R. C. Fletcher et al. Phys. Rev., 95, 844, 1954. G. Feher et al. Phys. Rev. 100, 1, 34, 1955. G. F. Koster et al. Phys. Rev. Lett., 4, 125, 1960.

ASSOCIATION: Institut poluprovodnikov AN USSR Kiyev (Semiconductor Institute of the AS UkrSSR, Kiyev)

SUBMITTED: June 2, 1961

Card 4/5

BUGAY, A.A.; LEVKOVSKIY, P.T.; MAKSIMENKO, V.M.; PASHKOVSKIY, M.V.;  
ROYTSIN, A.B.

Splitting of the electron paramagnetic resonance lines  $G_2^{31}$   
in  $ZnWO_4$  by an external electric field. Pis'. v red. zhur.  
eksp. i teoret. fiz. 2 no. 7:344-346 0 '65. (MIRA 13:12)

1. Institut poluprovodnikov AN UkrSSR, L'vov. Submitted  
Aug. 6, 1965.

L 40995-66 ENT(1) IJP(c) WJ:GG

ACC NR: AP6020205

SOURCE CODE: UR/0056/66/050/006/1510/1518

AUTHORS: Bugay, A. A.; Levkovskiy, P. T.; Maksimenko, V. M.;  
Pashkovskiy, M. V.; Roytsin, A. B.

ORG: Institute of Semiconductors, Academy of Sciences, Ukrainian SSR  
(Institut poluprovodnikov Akademii nauk Ukrainiskoy SSR)

TITLE: Splitting of EPR lines of  $\text{Cr}^{3+}$  in  $\text{ZnWO}_4$  by an external electric field

SOURCE: Zh eksper i teor fiz, v. 50, no. 6, 1966, 1510-1518

TOPIC TAGS: electric field, line splitting, Hamiltonian spin, ~~EPR~~

ABSTRACT: *electron paramagnetic resonance*  
Splitting of EPR lines of  $\text{Cr}^{3+}$  in  $\text{ZnWO}_4$  by an external electric field has been detected. An investigation has been made of the angular dependence of splitting (dependence of splitting value on orientation of external magnetic and electric fields with respect to crystallographic axes). A Hamiltonian spin is set up describing the interaction between the system and the external electric field. Corrections to the transition frequencies have been found. The theoretical results satisfactorily describe the experimental angular dependences of the splitting. The corresponding Hamiltonian spin constants have

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ACC NR: AP6020205

been determined. A correlation effect between the angular splitting dependence and angular dependence of the EPR half-width line has been detected for the first time in the absence of an external electric field. A qualitative interpretation of the phenomenon has been described. The authors thank M. F. Deygen and V. B. Steynshleyger for their constant interest in this work, V. A. Atsarkin for discussion of individual problems, and L. I. Datsenko for assistance in measurements. Orig. art. has: 6 figures, 9 formulas, and 2 tables. ~~Based on~~ [NOT] authors' abstract.

SUB CODE: 20/ SUBM DATE: 24Jan66/ ORIG REF: 007/ OTH REF: 008

Cord 2/2 11b

ACC NR: AP7007624

SOURCE CODE: UR/0386/67/005/003/0082/0085

AUTHOR: Bugay, A. A.; Roytsin, A. B.

ORG: Institute of Semiconductors, Academy of Sciences, Ukrainian SSR (Institut poluprovodnikov Akademii nauk Ukrainiskoy SSR)

TITLE: EPR in ruby in a constant electric field without a magnetic field

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 5, no. 3, 1967, 82-85

TOPIC TAGS: electron paramagnetic resonance, ruby, epr spectrum, spectral line, line width, line broadening

ABSTRACT: After first showing analytically that it is possible to observe EPR lines in a zero magnetic field by suitably sweeping an external electric field, the authors describe experiments made for this purpose with a direct-amplification EPR spectrometer using a klystron generating in the 11 - 12 GHz range. To increase the sensitivity, the electric field was modulated at 680 Hz frequency (the modulation amplitude could be varied). The signal was plotted automatically. A ruby sample with chromium concentration ~0.5% was investigated. The maximum electric field intensity in the sample could reach  $10^8$  v/cm. The center of the EPR line corresponded to an electric field of 548 kv/cm, and the width of the line at the points of maximum slope was ~50 kv/cm or 270 MHz. The position of the center of the line in the electric field varied with the microwave frequency. The line shape was Lorentzian. The line

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ACC NR: AP7007624

width was higher than obtained from an analysis of the causes of the broadening of ordinary EPR lines in ruby, the difference being due to the use of samples with high concentration and very uneven distribution of the chromium ions. The authors thank M. F. Deygen for a discussion of the results and P. T. Levkovskiy, V. M. Maksimerko, and L. I. Bereshinskiy for technical help. Orig. art. has: 1 figure and 2 formulas.

SUB CODE: 20/ SUBM DATE: 28Oct66/ OTH REF: 003

Card 2/2

L 12025-66 EWT(1) IJP(c) WW/GG  
ACC. NO. 415028000

SOURCE CODE: UR/0386/65/002/007/034455

AUTHOR: Rugay, A. A.; Levkovskiy, P. T.; Maksimenko, V. M.; Pashkovskiy, H. V.; Roytsin, A. B. 4/455 4/455 4/455 4/455 4/455ORG: Institute of Semiconductors Academy of Sciences, Ukrainian SSR (Institut  
provodnikov Akademii nauk Ukrainiskoy SSR) 4/455TITLE: Splitting of EPR lines of  $\text{Cr}^{3+}$  in  $\text{ZnWO}_4$  by an external electric fieldSOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu.  
(Prilozheniye), v. 2, no. 1, 1965, 344-346.

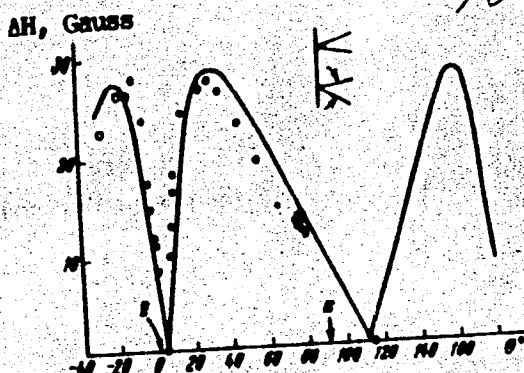
TOPIC TAGS: zinc compound, EPR spectrum, line splitting

ABSTRACT: The authors have observed the splitting of two  $\text{Cr}^{3+}$  EPR lines corresponding to transitions between the sublevels of the Kramers doublets occurring when an external static electric field  $E$  is applied to a  $\text{ZnWO}_4$  crystal, in which are two non-equivalent positions of the  $\text{Zn}^{2+}$  ion replaced by the  $\text{Cr}^{3+}$  ion. These positions differ in inversion with respect to the position occupied by the zinc ion, so that the shift of the EPR line should manifest itself in the form of its splitting. The dependence of the line splitting on the orientation of an external static magnetic field  $H$  was also investigated. The experiments were made with an EPR spectrometer operating at 9380 Mc and at room temperature. The angular dependence of the line splitting, corresponding to the transition between the sublevels of the lower Kramers doublet (Fig. 1), is presented for the case when the field  $E$  is directed along the crystallographic

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L 12025-66  
ACC NR: AP5028000

Fig. 1. Angular dependence of the EPR line splitting at  $E = 225$  kv/cm. Continuous curve - theoretical; points - experimental values obtained with sample no. 1; circles - with sample no. 2.



axis  $b$  ( $y$  axis), and the field  $H$  changes its orientation in the  $(xz)$  plane. The experimental points shown on the plot correspond to the directly measured splitting. The results agree with calculations based on the use of a spin Hamiltonian in the form  $W = W_0 + W_E$  where  $W_0$  is the usual spin Hamiltonian, including the operator of the Zeeman energy and the energy of the crystalline field and  $W_E$  is the operator of the energy of interaction with the external electric field  $E$ . Authors thank M. F. Deygen and V. B. Shteynshleyger for continuous interest in the work, and also L. I. Datsenko and N. F. Kogdenko for help with the measurements. Orig. art. has: 1 formula and 1 figure.

SUB CODE: 20/

SUBM DATE: 06Aug65/

ORIG REF: 002/

OTH REF: 002

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L 5406-66 EWT(1)/T LJP(c) GG

ACC NR: AP5027388

SOURCE CODE: UR/0181/65/007/011/3169/3174

AUTHOR: Roytsin, A. B. 44,55

51  
42  
B

ORG: Institute of Semiconductors, AN UkrSSR, Kiev (Institut poluprovodnikov AN UkrSSR) 44,55

TITLE: Accounting for deviations from the ideal crystal in spin-lattice relaxation theory 21,44,55

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3169-3174

TOPIC TAGS: spin lattice relaxation, crystal lattice defect, crystal lattice vibration

ABSTRACT: The author calculates the probability of relaxation transitions with a change in spin state due to lattice vibrations for a unidimensional non-ideal crystal containing both isotopic and isobaric defects. The frequency ranges are defined in which the deviation from an ideal lattice affects the frequency dependence of the relaxation time. Some of the particular features of spin-lattice relaxation of localized centers based on vacancies (e. g. F-centers) are discussed. The formulas derived indicate anomalous behavior with respect to relaxation transitions in

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ACC NR: AP5027388

the localized frequency range. Due to the symmetry of the problem, there are two types of relaxation transitions with probabilities which differ considerably with respect to frequency and mass ratio. The group-theoretical analysis used in the paper may be applied to more complex problems in the adiabatic theory of spin-lattice relaxation. In conclusion, I take this opportunity to thank M. F. Deygen for examination of the manuscript and useful consultation, B. L. Vinetskiy for discussion of certain problems touched upon in the work, and V. G. Blyashov for assistance with the calculations. Orig. art. has: 2 tables, 7 formulas.

SUB CODE: SS/ SUBM DATE: 25Mar65/ ORIG REF: 004/ OTH REF: 003

BVK

Card 2/2

ROYTSIN, A.B. [Roitsyn, O.B.]

Theory of double electron-nuclear resonance of F-centers in  
alkali halide crystals. Ukr. fiz. zhur. 10 no.2:147-152 F '65.  
(MIRA 18:4)

1. Institut poluprovodnikov AN UkrSSR, Kiyev.

L 33238-65 EWT(1)/T/EEC(b)-2 LJP(c)

ACCESSION NR: AP5005909

8/0185/65/010/002/0147/0152

AUTHOR: Rovtsyn, O. B. (Roytsin, A. B.)TITLE: On the theory of electron-nuclear double resonance of F-centers in NaCl-type crystals

SOURCE: Ukrayins'kyy fizychnyy zhurnal, v. 10, no. 2, 1965, 147-152

TOPIC TAGS: electron spin, electron nuclear double resonance, spin nuclear transition

ABSTRACT: An investigation is made of the role of electron spin in the reorientation of nuclei and the effect of static and alternating electric fields on the electron-nuclear double resonance (ENDOR) spectrum. To determine the role of electron spin, the square of the matrix element of spin-nuclear transitions was calculated. Apparently, the transition matrix element depends on hyperfine interaction constants. This would lead to the conclusion that the intensity of the ENDOR line depends on the orientation of the vector of the magnetic field (static and time-dependent) intensity in the crystal. To find the effect of static and alternating electric fields on the ENDOR spectrum, the spin-Hamiltonian of the interaction of nuclei with the electric field was obtained. Corrections were determined for the frequencies of spin-nuclear transitions in static electric fields.

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ACCESSION NR: AP5005909

and the matrix elements of transitions induced by the electric component of the radio-frequency field were calculated. It was found that a static electric field eliminates degeneration associated with the equivalence of two nuclei located on one axis. An alternating electric field causes transitions according to the selection rule  $\Delta m = \pm 1, \pm 2$ . The corresponding matrix elements are very sensitive to the orientation in the crystal of the static magnetic field and the electric field inducing the transition. Orig. art. has: 1 figure, 6 formulas, and 1 table. [JA]

ASSOCIATION: Instytut napivprovidnykiv AN URSR, Kiev (Institute of Semiconductors, AN UkrSSR)

SUBMITTED: 19May64

ENCL: 00

SUB CODE: NP

NO REF SOV: 002

OTHER: 003

ATD PRESS: 3207

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ROYTSIN, A.B. [Roitsyn, O.B.]

Local symmetry of electron centers in semiconductors. Ukr.  
fiz. zhur. 8 no.10:1085-1091 0 '63. (MIRA 17:1)

1. Institut poluprovodnikov AN UkrSSR, Kiyev.

ROITSIN, A.B.

Microwave analogs of the Faraday, Cotton-Mouton, and Kerr effects  
in semiconductors. Fiz. tver tela 5 no.9:2395-2401 S '63.  
(MIRA 16:10)

1. Institut poluprovodnikov AN UkrSSR, Kiyev.

DEYGEN, M. F.; ZEVIN, V. Ya.; MAYEVSKIY, V. M.; ROYTSIN, A. B.

"Some problems of paramagnetic resonance of local centers on semiconductors."

report submitted for Intl Conf on Physics of Semiconductors, Paris, 19-24  
Jul 64.

ROYTSIN, A.B.

Role of diamagnetism in paramagnetic resonance. Fiz.tver.tela  
4 no.10:2982-2983 0 '62. (MIRA 15:12)

1. Institut poluprovodnikov AN UkrSSR, Kiyev.  
(Diamagnetism)  
(Paramagnetic resonance and relaxation)

ROYTSIN, A. B.

Role of electric fields in paramagnetic resonance. Fiz. tver.  
tela 5 no.1:151-157 Ja '63. (MIRA 16:1)

1. Institut poluprovodnikov AN Ukr-SSR, Kiyev.

(Paramagnetic resonance and relaxation)  
(Electric fields)

44154

S/181/62/004/010/049/063  
B102/B112

AUTHOR: Roytsin, A. B. (1)

TITLE: The part played by electric fields in paramagnetic resonance

PERIODICAL: Fizika tverdogo tela, v. 4, no. 10, 1962, 2948-2957

TEXT: As shown by Ludwig and Woodbury (Phys. Rev. Lett., 7, No. 6, 240, 1961) the application of a static electric field causes splitting of the paramagnetic resonance lines. This effect is ascribed to the action of the field on the "spin" levels which may cause a splitting or alternatively a shift of the levels. The effect of constant or alternating electric and magnetic fields on the paramagnetic resonance of localized electron centers in crystals is studied theoretically and a method is devised analogous to that for describing the Zeeman splitting (see Koster et al. Phys. Rev. 109, 227, 1958; 113, 445, 1959; 115, 1568, 1959; 116, 811, 1959). The method is somewhat more general than that of the spin Hamiltonian. Its authors call it the method of the perturbation matrix. Its advantage lies in that the relations holding between the different types of atomic (ionic) interaction in the crystal need not be known.

Card 1/4 (1) See also: S/181/62/004/010/058/063

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The method is demonstrated by the example of the  $V^{++}$  ion in the interstitial position of the silicon lattice (point group Td). A perturbation operator  $\hat{V} = \mu(L+2S)H - (PE)$  is defined where S and L are the operators of spin and orbital angular momentum,  $\mu$  is Bohr's magneton. For this operator the perturbation matrix is constructed, the elements of which are given by

$$M_{ij}^k = \frac{1}{g} \sum_{f, n, l} M_{fi}^n \sum_G \Gamma_{fi}^{*n}(G) \Gamma_{ij}^k(G) \gamma_{ln}^k(G^{-1}), \quad (3).$$

$g$  being the total number of group elements and  $G$  the point group. The method is used to study separately the effect of variable and constant electric fields; considering also their effect on nuclear spin transitions. It can be shown that constant fields may change the position of the energy levels and split them. Variable fields may cause additional transitions between the "Zeeman" levels of the system. For an interstitial iron atom ( $3d^6$  configuration) the perturbation matrix has one row less and takes the following form:

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$$\begin{array}{ccc}
 -\beta \dot{H}_x & \frac{\beta}{\sqrt{2}} (H_x + iH_y) + & i\alpha E_x \\
 & + \frac{\alpha}{\sqrt{2}} (E_y + iE_z) & \\
 \frac{\beta}{\sqrt{2}} (H_x - iH_y) + & 0 & -\frac{\beta}{\sqrt{2}} (H_x + iH_y) + \\
 + \frac{\alpha}{\sqrt{2}} (E_y - iE_z) & & + \frac{\alpha}{\sqrt{2}} (E_y + iE_z) \\
 -i\alpha E_x & -\frac{\beta}{\sqrt{2}} (H_x - iH_y) + & \beta H_x \\
 & + \frac{\alpha}{\sqrt{2}} (E_y - iE_z) & 
 \end{array}$$

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If  $E_x = E_y = H_z = 0$  (Ludwig-Woodbury experiments) the resonance frequencies are  $h\nu_{1,2} = \beta H \pm \frac{3}{2} \alpha E \sin 2\varphi$ . It follows from intensity estimates that the effects considered will be observable if the fields are strong enough. There are 1 figure and 1 table. f

ASSOCIATION: Institut poluprovodnikov AN USSR, Kiyev (Institute of Semiconductors AS UkrSSR, Kiyev)

SUBMITTED: April 28, 1962 (initially)  
June 16, 1962 (after revision)

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44160

S/181/62/004/010/058/063  
B102/B104

AUTHOR: Roytsin, A. B.

TITLE: The role of diamagnetism in paramagnetic resonance

PERIODICAL: Fizika tverdogo tela, v. 4, no. 10, 1962, 2982 - 2983

TEXT: In further studies of the electric-field effect on the spin levels of paramagnetic centers (FTT, 4, \* 2952, 1962) the author calculates the effect of the diamagnetic component  $\hat{V} = (e^2/2mc^2) \sum_k \left[ \vec{Hr}_k \right]^2$  on the

paramagnetic resonance of the iron atom ( $3d^8$  configuration) in the Si lattice (Td symmetry).  $\vec{r}_k$  is the coordinate of the k-th electron (e, m).

Following the method suggested in the previous paper the non-vanishing matrix elements are determined and the matrix of the perturbation operator is constructed. It is shown that in the simple case  $H(0,0,H_z)$  the

diamagnetic component leads to a paramagnetic resonance line splitting

$\Delta\nu = 4\beta H^2/h$  where

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\* S/181/62/004/010/049/063

The role of diamagnetism...

S/181/62/004/010/058/063  
B102/B104

$$\beta = \frac{e^2}{2mc^2} \frac{1}{2} \bar{z}^2; \bar{z}^2 = \sum_k \left[ \int \psi_{\pm 1}^* z_k^2 \psi_{\pm 1} d\tau - \int \psi_0^* z_k^2 \psi_0 d\tau \right].$$

The subscripts  $\pm 1$  and 0 refer to the total-spin projections. For  $H = 10$  koe and  $\bar{z}^2 = (5 \cdot 10^{-8})^2$  the splitting amounts to several oersteds.

ASSOCIATION: Institut poluprovodnikov AN USSR, Kiyev (Institute of Semiconductors AS UkrSSR, Kiyev)

SUBMITTED: June 14, 1962

Card 2/2

S/181/63/005/001/025/064  
B102/B186

AUTHOR: Roytsin, A. B.

TITLE: The role of electric fields in paramagnetic resonance

PERIODICAL: Fizika tverdogo tela, v. 5, no. 1, 1963, 151-157

TEXT: In a previous investigation (FTT, 4, 10, 1962) the author applied the perturbation matrix to calculate the effect of constant and alternating electric fields on the paramagnetic resonance of iron-group elements in crystals, assuming that the ground level showed no orbital degeneracy. Here he does the same for the case of an orbitally degenerate ground state, e. g. for  $\text{Cr}^0$  or  $\text{Mn}^+$  in diamond-type lattices. The perturbation matrix, a 15-by-15 one, is given explicitly and the

contributions  $\theta_{ik}^a = \sum \frac{M_{il} M_{lk}}{\epsilon_a - \epsilon_l}$  are calculated in second perturbation-theoretical approximation for the representations  $\Gamma_4^{(1)}$ ;  $\Gamma_4^{(2)}$ ,  $\Gamma_5^{(1)}$  and  $\Gamma_5^{(2)}$ ;  $\Gamma_3$ ; and  $\Gamma_1$ .  $\epsilon_a$  denotes the distance between a level with the

Card 1/2

The role of electric fields in ...

S/181/63/005/001/025/064  
B102/B186

representation  $\Gamma_\alpha$  and the next lower term. The term splitting in the magnetic or electric field is determined by solving the secular equation  $|M - (\epsilon - \epsilon_\alpha)I| = 0$ , where  $I$  is a unit matrix. The energy levels of the system and the possible transitions between them are calculated from the perturbation operator. The theoretical results are applied and compared with experimental data for the  $\Gamma_4^{(1)}$  representation; the following special cases are discussed: a) Level splitting by static electric field ( $E_0 \neq 0, H_0 = 0$ ); b) Splitting of the  $\Gamma_4^{(1)}$  term by a constant magnetic field ( $E_0 = 0, H_0 \neq 0$ ). The agreement between theory and experiment is very good; this is demonstrated by numerical calculations for interstitial  $Cr^0$  and  $Mn^+$  ( $3d^6$  configuration) in a diamond-type lattice. There are 1 figure and 3 tables.

ASSOCIATION: Institut poluprovodnikov AS USSR, Kiyev (Institute of Semiconductors AS UkrSSR, Kiyev)

SUBMITTED: July 23, 1962  
Card 2/2

ACCESSION NR: AP4012789

S/0170/64/000/002/0003/0009

AUTHOR: Kremenchugskiy, L. S.; Ly\*senko, V. S.; Mal'nev, A. F.; Roytsina, O. V.

TITLE: The determination of the thickness, heat capacity, and thermal conductivity of thin miniature films

SOURCE: Inzhenerno-fizicheskiy zhurnal, no. 2, 1964, 3-9

TOPIC TAGS: thin film, film thickness, heat capacity, thermal conductivity

ABSTRACT: Thin miniature films are widely used as sensing elements for heat radiation detectors and for circuits measuring the power of ultra high frequencies. The essence of the new method for determining the physical characteristics of such films is the determination of the heat capacity C of the bolometer layer from its time constant which, in turn, is found from the frequency characteristics and the effective coefficient of thermal losses of the layer, as shown in Equation (8)

$$C = \frac{\sqrt{3}}{2\pi f_{\frac{1}{2}}} \frac{1^2 R_0^2 \alpha}{R - R_0} \quad (8)$$

Card 1/64

ACCESSION NR: AP4012789

( $i$  = excitation current;  $R$ ,  $R_0$  = bolometer layer resistance during the passage of current, and its initial resistance, respectively;  $\alpha$  = temperature coefficient of resistance;  $f_{1/2}$  = frequency corresponding to the half-maximum of intensity on the frequency characteristics). From the known heat capacity and the surface of the layer one gets Equation (9) which gives the thickness  $d_c$  of the layer

$$d_c = C / c_{sp} A \gamma. \quad (9)$$

( $c_{sp}$  = specific heat capacity;  $A$  = area of the layer;  $\gamma$  = density). Using further the equation of the heat balance of the layer, one gets an expression for the coefficient of thermal conductivity given in Equation (13)

$$K = \frac{\alpha i^2 R_0^2 l}{12 (R - R_0) S} \left[ 1 - \frac{2 (8 \epsilon \sigma T_0^3 b) - \alpha i^2 R_0 (R - R_0)}{\alpha i^2 R_0^2} \right]. \quad (13)$$

( $l$ ,  $b$  = length and width of the layer, respectively;  $S$  = cross sectional area of the layer;  $\epsilon$  = coefficient of absorption of the layer;  $\sigma$  = Stephan-Boltzmann constant;

Card 2/4

ACCESSION NR: AP4012789

$T_0$  = temperature of the surrounding medium). The heat capacity of bolometric elements was determined earlier by Jones, Smith, and Chesner (Determination and Measurement of Infrared Radiations) using the time constant and the volt-watt sensitivity. Since they assumed  $\epsilon$  to be zero, this led to significant errors because  $\epsilon$  actually varies between 0.05 and 1.00. Other researchers (see e.g., G. Barth and W. Maier, Ann. d. Phys., 7, 260, 1959) utilized the heat-loss coefficient in absence of radiations, which reduced the accuracy of measurements by a factor  $R/R_0$ . The authors determined the heat capacity, thickness, and thermal conductivity coefficients of free  $4 \times 0.4 \text{ mm}^2$  Ni layers obtained electrolytically. The experimental results are summarized in the Table of Enclosure 1. Experiments carried out down to the temperature of liquid nitrogen did not produce any significant changes in the heat capacity of thin Ni layers, while the thermal conductivity increased by a very small amount. The authors applied the same method to determinations of the heat capacity of thin layer coatings deposited on film, by subtraction of the film's capacity from the total measured amount. A maximum heat capacity of Au coating of  $(0.35-0.45) \cdot 10^{-6} \text{ watt} \cdot \text{sec}/^\circ\text{K}$  (corresponding to a maximum relative sensitivity of the coated bolometer) was obtained with a  $(3.0-4.5) \cdot 10^{-6} \text{ kg}$  gold coating. The Au layer contributed to a 50-70% absorption of the  $4-15 \mu$  radiation. Orig. art. has 13 equations, 2 figures and 1 table.

Card 3/6H

ACCESSION NR: AP4012789

ASSOCIATION: Institut fiziki (Institute of Physics), AN UkrSSR, Kiev

SUBMITTED: 20Feb63

DATE ACQ: 26Feb64

ENCL: 02

SUB CODE: PH, SP

NO REF SOV: 002

OTHER: 005

Card 4/64

ROYTSINA, O.V.

Design of quick-acting bolometers. Zhur. prikl. spektr. 3  
no.5:403-409 N '65. (MIRA 18:11)

L 22934-66 EWT(1) IJP(c) CC

ACC NR: AP6012850

SOURCE CODE: UR/0368/66/004/004/0298/0301

AUTHOR: Kremenchugskiy, L. S.; Lysenko, V. S.; Mal'nev, A. F.; Roytsina, O. V. 5/13

ORG: none

TITLE: Improvement of spectral characteristics of high-resistance thermal radiation detectors 2/

SOURCE: Zhurnal prikladnoy spektroskopii, v. 4, no. 4, 1966, 298-301

TOPIC TAGS: thermal radiation detector, IR radiation, IR sensor, IR detection

ABSTRACT: An improved method is proposed for the construction of high-resistance thermal-radiation detectors which use gold-black as the infrared absorber. Because of its poor adhesive properties, gold-black cannot be deposited directly on the sensitive material, but must be deposited on an interleaving layer, which causes high heat losses. Calculations are presented to demonstrate that these losses can be reduced to an insignificant amount if the interleaving layer is made of dielectrics such as beryllium- or aluminum-oxides, which are good heat conductors, and if the layer's thickness is much less than the length of the incident heat wave. Experimental data are in good agreement with the theory. Orig. art. has: 4 formulas, 2 tables, and 1 figure. [ZL]

SUB CODE: 20/ SUBM DATE: 02Apr65/ ORIG REF: 001/ OTH REF: 004/ ATD PRESS: 4237

Card 1/1 20

UDC: 621.317.794

L 10884-66 EWT(1) IJP(c) CC

ACC NR: AP6000020

SOURCE CODE: UR/0368/65/003/005/0403/0409

AUTHOR: <sup>44, 55</sup> Roytsina, O. V.

ORG: none

TITLE: Design of <sup>21, 44, 55</sup> high-speed bolometers <sup>25B</sup>

SOURCE: Zhurnal prikladnoy spektroskopii, v. 3, no. 5, 1965, 403-409

TOPIC TAGS: bolometer, heat radiation, electronic measurement

ABSTRACT: A solution is found for the nonhomogeneous equation of heat conduction for a rigid bolometer consisting of a sensing element, a dielectric interlayer, and a heat sink. The sensing element is heated by the incident sinusoidally modulated radiation flux and by a dc voltage across it. Conditions are found for making bolometers with voltage-power characteristics which are nearly independent of the modulation frequency of the incident radiation flux within a given frequency range. Design formulas are derived for determining the temperature of the sensing element, the voltage-power characteristics and other basic parameters of rigid bolometers. Expressions are given for selecting the material and optimum thickness of the interlayer and heat transfer layer for fast-response bolometers. The best bolometers in this case are those with a copper heat sink and a silicon oxide interlayer. "In-".

UDC: 621.317.794

Card 1/2

L 10884-66

ACC NR: AP6000020

conclusion I thank <sup>44.55</sup>A. F. Mal'nev and <sup>44.55</sup>L. S. Kremenchugskiy for interest in the work, and also A. G. Momanchuk for assistance with the numerical calculations." Orig. art. has: 3 figures, 1 table, and 20 formulas. [14] <sup>9</sup>

SUB CODE: 09,20/

SUBM DATE: 13Nov64/

ORIG REF: 004/

OTH REF: 005

ATD PRESS: 4172

Card

jw  
2/2

KREMENCHUGSKIY, I.S.; ROYTSINA, O.V.

Design and experimental study of the zonal sensitivity of metallic bolometers. Prib. i tekhn. eksp. 10 no.1:153-157 Ja-F '65. (MIRA 18:7)

1. Institut fiziki AN UkrSSR.

ARTYUKHOVSKAYA, L.M. [Artiukhovs'ka, L.M.]; KREMENCHUGSKIY, L.S.  
[Kremenchuhs'kyi, L.S.]; MAL'NEV, A.F. [Mal'niev, A.F.];  
ROYTSINA, O.V. [Roitsyna, O.V.]

Effect of the size of the receiving area on the principal characteristics of metal vacuum bolometers. Ukr. fiz. zhur. 9 no.11:  
1240-1247 N '64 (MIRA 18:1)

1. Institut fiziki AN UkrSSR, Kiyev.

KREMENCHUGSKIY, L.S.; LYSENKO, V.S.; MAL'NEV, A.F.; ROYTSINA, O.V.

Determination of the thickness, heat capacity, and heat conductivity  
of small-size thin films. Inzh.-fiz. zhur. 7 no.2:3-9 F '64.  
(MIRA 17:2)

1. Institut fiziki AN UkrSSR, Kiyev.

KREMENCHUGSKIY, L.S. [Kremenchuhs'kyi, L.S.]; MAL'NEV, A.F. [Mal'niev, A.F.];  
ROYTSYNA, O.V. [Roitsyna, O.V.]

Dynamic characteristics of vacuum metallic bolometers. Ukr. fiz. zhur.  
7 no.12:1298-1308 D '62. (MIRA 15:12)

1. Institut fiziki AN UkrSSR, Kiyev.  
(Bolometer)

L 20248-65 EED-2/EEO-2/EWT(1) Pn-4/Pl-4/Pae-2 IJP(c)/SSD/AFWL/ASD(s)/  
ESD(gs) CC  
ACCESSION NR: AP5000629 S/0185/64/009/011/1240/1247 <sup>6</sup><sub>B</sub>

AUTHOR: Artyukhova's'ka, L. M. (Artyukhovskaya, L. M.); Kremenchugs'ky'y,  
L. S. (Kremenchugskiy, L. S.); Mal'nyev, A. F. (Mal'nev, A. F.);  
Roytsy'na, O. V. (Roytsina, O. V.)

TITLE: Effect of the size of the detection area on the basic characteristics of metal vacuum bolometers

SOURCE: Ukrayins'ky'y fizy\*chny\*y zhurnal, v. 9, no. 11, 1964, 1240-1247

TOPIC TAGS: metal vacuum bolometer, bolometer, thermal radiation measurement <sup>75B</sup>

ABSTRACT: The effect of the size of the detection area of nickel bolometers on the sensitivity and the inertia was investigated. The general case of heat removal from the bolometer either by radiation or by conduction of the film was discussed. It was found that the dependence of bolometer sensitivity on the width of the detecting element is much stronger than it is on the length of the element;

Card 1/2

L 20248-65

ACCESSION NR: AP5000629

for the inertia factor, the opposite is true. Orig. art. has: 5 figures,  
2 tables, and 7 formulas.

ASSOCIATION: none

SUBMITTED: 03Mar64

ENCL: 00

SUB CODE: NP

NO REF SOV: 003

OTHER: 003

ATD PRESS: 3162

Card 2/2

L 37700-65 EEO-2/EWT(1)/EED-2 Pn-4/Pae-2/P1-4 IJP(c) CC

ACCESSION NR: AP5007047

8/0120/65/000/001/0153/0157

AUTHOR: Kremenchugskiy, L. S.; Roytsina, O. V.

TITLE: Calculation and experimental investigation of the zone sensitivity of metal bolometers

SOURCE: Pribory i tekhnika eksperimenta, no. 1, 1965, 153-157

TOPIC TAGS: bolometer design, bolometer sensitivity, metal bolometer, bolometer

ABSTRACT: The methodology, experimental setup, and conclusions drawn from zone-sensitivity measurements in vacuum and gas-filled bolometers are presented. Relationships of zone sensitivity  $S$  to such parameters as dimensions and position of the detection area, modulation frequency of the incident radiation, and type of material are derived. The effects of heat loss on sensitivity and the selection of optimum operating current are considered. Radiation from an incandescent lamp was focussed on 0.15-mm segments of nickel, gold, and bismuth specimens 0.1  $\mu$  thick. Specimen length  $l$  was 1.5-8 mm; specimen width, 0.2-1 mm; radiation modulation frequencies, 5-200 cps; pressure,  $10^{-3}$  and 760 mm Hg. Curves of relative zone sensitivity versus detection-area dimensions and modulation frequency were plotted and compared with curves of relative temperature distribution along the bolometer

Card 1/2

L 37200-65

ACCESSION NR: AP5007047

sensing element heated solely by its own current. At  $l < 30/f$ , the curves were similar, and proper operating current could therefore be determined from zone-sensitivity curves. It was also concluded that the intensity of incident radiation could be determined from zone-sensitivity curves. Heat loss as the result of the thermal conductivity of the sensing element tended to cause nonuniformity of zone sensitivity. Orig. art. has: 4 figures and 3 formulas. [PW]

ASSOCIATION: Institut fiziki AN UkrSSR (Physics Institute, AN UkrSSR)

SUBMITTED: 18Dec63

ENCL 00

SUB CODE: NP

NO REF SOV: 002

OTHER: 002

ATT PRESS: 3218

Card 2/2

L 00583-66 EWT(d)/EWP(c)/EWP(v)/T/EWP(k)/EWP(l)/ETC(m) WW  
UR/0286/65/000/013/0083/0084

ACCESSION NR: AP5021612

AUTHORS: Tishin, S. I.; Shkarlet, Yu. M.; Royuk, N. V.

TITLE: Device for continuous contactless detection of defects in cylindrical ferromagnetic products. Class 42, No. 172539 17

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 13, 1965, 83-84 27  
26  
B

TOPIC TAGS: defect indicator, ferromagnetic material

ABSTRACT: This Author Certificate presents a device for continuous contactless detection of defects in cylindrical ferromagnetic products, based on the method of eddy currents. The device contains a high frequency generator, a power amplifier amplifying the high frequency voltage from the generator, a transducer supplied from this amplifier, an amplifier for amplifying the signal obtained from the transducer, an amplitude detector detecting the amplified signal from the transducer and an indicator recording the voltage change at the output of the amplitude detector. To increase the sensitivity and exposure of defects in background noise caused by changes of the magnetic permeability and conductivity in the controlled product, a slave magnetic system is introduced in the device. This controls the magnetization of the controlled product. The system contains an amplifier-limiter

Card 1/2

L 00583-66

ACCESSION NR: AP5021612

which amplifies and limits the high frequency generator voltage and a phase shifter for changing the phase of the limited voltage supplied by the generator. This voltage is a reference for a phase detector which supplies a constant voltage proportional to the phase changes of the amplified voltage from the transducer output. The system also contains an electromagnet creating the field magnetizing the controlled product and a regulating unit establishing the magnitude of the constant current passing through the electromagnet depending on the magnitude of the voltage from the phase detector output.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut tekhnologii i mashinostroyeniya (Central Scientific Research Institute of Technology and Machine Construction)

SUBMITTED: 09Apr64

NO REF SOV: 000

ENCL: 00

OTHER: 000

SUB CODE: SS, MT

Card 2/2

ROYUK, V.Ya. (Primorskoye Stalinskoy oblasti).

Plotting simple diagrams. Mat. v shkole no.6:48-55 N-D '56.  
(MIRA 10:1)

(Graphic methods--Study and teaching)

ROEWALTER, A.

2280. AUTO-IGNITION OF HUNGARIAN COAL. Roewalter, A. (Magyar Tech., 1947, 2. 21-2; Chem. Abstr., 1947, 41, 7733-4).

The self-ignition of Hungarian coals is induced by an oxidation process beginning in local centres of humic components of coals. The self-ignition is promoted by the presence of alkaline water deriving from weathered minerals of the covering rock layers and sometimes also by the deformation of layers of the coal deposit which produces cracks and permits air to penetrate to the coal particles.  
C. A.

immediate source clipping

ROYZ, B.

Voluntary economist should have an honorary position in industry.  
NTTO 5 no.4:15-16 Ap '63. (MIRA 16:3)

1. Predsedatel' komiteta po ekonomike Kuybyshevskogo oblastnogo  
soveta Nauchno-tekhnicheskikh obshchestv.  
(Industrial management)

ROYZ, M.; ZALISSKIY, A. (Minsk); BALLOV, D.; LANG, N.

Using suggestions of efficiency promoters. Prom.koop. 12 no.4:28-29  
Ap '58. (MIRA 11:4)

1. Nachal'nik proizvodstvenno-tekhnicheskogo otдела oblpromsoвета,  
Poltava (for Royz). 2. Starshiy inzhener oblbytpromsoвета, Ryazan'  
(for Ballov). 3. Artel' "Tekstil'shveyprom," Ivanovo (for Lang).  
(Cooperative societies)

67629

SOV/81-59-14-50317

15.2210

Translation from: Referativnyy zhurnal, Khimiya, 1959, Nr 14, p 329 (USSR)

AUTHORS: Royzen, A.I., Markevich, Ye.P.

TITLE: Dense Forsterite Products of Uktuska Dunite

PERIODICAL: Byul. nauchno-tekhn. inform. Ukr. n.-i. in-t ogneuporov, 1958, Nr 4, pp 27 - 43

ABSTRACT: The article describes experiments on the production of dense forsterite refractories. The laboratory investigations were carried out with the aim of making the effect of the individual factors more precise on using burnt and crude dunite, dunite silt or silt of a mixture of dunite with magnesite for obtaining dense forsterite refractories. The chemical composition of dunite (in %):  $\text{SiO}_2$  34.74,  $\text{Al}_2\text{O}_3$  0.78,  $\text{Cr}_2\text{O}_3$  0.4,  $\text{Fe}_2\text{O}_3$  4.35,  $\text{FeO}$  4.95,  $\text{MnO}$  0.28,  $\text{MgO}$  42.38,  $\text{CaO}$  0.32, alkalis 0.4, p.p.p. 11.6. The dunite was burned at  $1,450^\circ\text{C}$ . For binding  $\text{SiO}_2$  and the sesquioxides into forsterite and spinelides, 20 - 30% of sintering magnesite powder was introduced. Fine grinding of dunite and magnesite was carried out in a ball mill. The samples were pressed under a pressure of 400, 800 and  $1,200 \text{ kg/cm}^2$  and burnt at 1,500, 1,600,  $1,650^\circ\text{C}$

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SOV/81-59-14-50317

Dense Forsterite Products of Uktuska Dunite

and 1,750°C. It was established that the application of magnesite with the least quantity of admixtures, the use of burnt dunite, the simultaneous grinding of dunite with magnesite, an increase of the quantity of the fine fraction in the mass to 40 - 42%, an increase of the burning temperature of the products to 1,600 - 1,700°C, and an increase of the quantity of magnesite in the charge to 45% promote an increase of the density of forsterite products made of Uktuska dunite. A batch of products of industrial type was obtained under the conditions of a pilot plant with a porosity of 10 - 11% (burning at 1,650°C).

G. Gerashchenko

Card 2/2

SHAFTERMAN, M.; ROYZ, A.; DEMYANKO, F.

Assembling and operating MJKZ-35 feed mills. Mik.-slov.prom.  
25 no.6:17-18 Ja '59. (MIRA 12:9)

1. Proizvodstvenno-tekhnicheskij oddel Kaluzhskogo upravleniya  
khleboproduktov (for Shaferman). 2. Vyselkovskiy khlebopriyemnyy  
punkt Krasnodarskogo kraya (for Royz, Demyanko).  
(Feed mills)

TERNOV-TROP, L.K., izb.: ROYZ, I.A., inzh.; SOGOLOV, I.I., inzh.

Hammer mill clutches. Energetik 12 no.7:17-20 J1 '64.  
(MIRA 17:9)

KUKOLEV, G. V., ROYZEN, A. I.

Cement

Binding and ceramic characteristics of alumina-containing cements with a high Al<sub>2</sub>O<sub>3</sub> content. Zhur. prikl. khim. 25 no. 5 (1952)

Monthly List of Russian Accessions, Library of Congress, August 1952. UNCLASSIFIED.

KARYAKIN, L.I., prof., doktor geologo-mineral.nauk; ROYZEN, A.I., kand.tekhn.  
nauk

Changes in the phase composition of magnesite linings after  
service in furnaces. Ogneupory 19 no.5:217-222 '54. (MIRA 11:8)

1.Khar'kovskiy institut ogneuprov.  
(Firebrick--Testing) (Metallurgical furnaces--Maintenance and repair)

15 (2), 15 (6)

AUTHORS:

Zhikharevich, S. A., Royzen, A. I., SOV/131-59-7-6/14  
Gin'yar, Ye. A., Kozyreva, L. A., Kablukovskiy, A. F.,  
Skorokhod, S. D.

TITLE:

Refractory Concrete as Electric Insulating Material for  
Electrode Coolers of Electric-arc Furnaces (Ogneuporny  
beton kak elektroizolyatsionnyy material dlya okhladiteley  
elektrodov dugovykh staleplavil'nykh pechey)

PERIODICAL:

Ogneupory, 1959, Nr 7, pp 309-319 (USSR)

ABSTRACT:

The magnesite-chromite tiles in the arch of a steel-melting furnace are saturated, during operation, by iron- and chromous oxide, and become more conductive in this way, which often leads to short circuits and a burning through of the coolers. Figure 1 shows the dependence of the logarithm of the specific electric resistance on the temperature for some industrial refractories. At the experimental plant of the Ukrainskiy nauchno-issledovatel'skiy institut ogneuporov (UNIIO) (Ukrainian Scientific Research Institute of Refractories (UNIIO)) and at the Semiluki Works, experiments with highly aluminous refractories, the original materials of which are indicated in a table, were carried out. The microscopic investigations were carried out by N. Ye. Drizheruk (Footnote 2).

Card 1/4

Refractory Concrete as Electric Insulating Material  
for Electrode Coolers of Electric-arc Furnaces

SOV/131-59-7-6/14

The mass composition and the properties of the samples are indicated in table 1. Figure 2 shows the thermal expansion, and figure 3 the dependence of the logarithm of the specific electric resistance of the samples. It was not possible, however, to ensure the electric insulation of the coolers in this way. Highly aluminous cement was also prepared at the experimental plant of the UNIIO. Highly aluminous fire clay with a grain size of from 3 to below 0.09 mm was used as a filler. The chemical composition and refractoriness of the cement and of the fire clay are indicated in table 2. The petrographic investigation was carried out by L. A. Kuz'mina (Footnote 3), the X-ray examination by B. Ya. Sukharevskiy (Footnote 4), and the thermal analysis by V. V. Pustovalov (Footnote 5 and Fig 4). Further experiments were carried out with leaned masses, the composition, density and strength values of which are indicated in table 3. The characteristic of the samples is shown in table 4. Figure 5 shows the cohesion of the concrete with a refractory product and an iron tube, and figure 6 shows the cohesion of the concrete with a magnesite-chromite tile. But also this experiment did not ensure an adequate electric insulation of the coolers. Experiments with highly aluminous cement and highly aluminous tiles of a

Card 2/4

Refractory Concrete as Electric Insulating Material . . . SOV/131-59-7-6/14  
for Electrode Coolers of Electric-arc Furnaces

mullite-cordierite composition were also carried out at the experimental plant of the UNIIO. The properties of the cement and concrete with the filler of highly aluminous fire clay are indicated in table 5. Some data characterizing the quality of the highly aluminous arch tiles and of the fire clay are indicated in table 6. The insulation of the coolers by refractory concrete is carried out in 2 variants (Figs 7 and 8). The chemical composition of the concrete zone and of the slag crust is shown in table 7. The petrographic investigation was carried out by M. Ye. Drizheruk (Footnote 7). Figure 9 shows a concrete piece after 72 melts. The experiments carried out showed that the use of concrete eliminates the burning through of the coolers by short circuit, and extends the working period of the furnace arches by 12-15 %. Conclusions: The satisfactory application results of the concrete insulation for electrode coolers should be introduced, as soon as possible, in all electrometallurgic plants, particularly in the furnaces working with oxygen. The series production of the material needed for the insulation should be organized. There are 9 figures, 8 tables, and 20 references, 10 of which are Soviet.

Card 3/4

Refractory Concrete as Electric Insulating Material      SOV/131-59-7-6/14  
for      Electrode Coolers of      Electric-arc Furnaces

ASSOCIATION:      Ukrainskiy nauchno-issledovatel'skiy institut ogneporov  
                            (Ukraine Scientific Research Institute of Refractories)  
                            (Zhikharevich, S. A., Royzen, A. I., Gin'yar, Ye. A.,  
                            Kozyreva, L. A.); Zavod "Elektrostal'" ("Elektrostal'" Works)  
                            (Kablukhovskiy, A. F., Skorokhod, S. D.)

Card 4/4

ROYZEN, H. I.

*Refect*

Chemical Abst.  
Vol. 48 No. 9  
May 10, 1954  
Cement, Concrete, and Other  
Building Materials

Hydraulic and ceramic properties of  $Al_2O_3$ -enriched alu-  
minate cements. G. V. Kukolev and A. I. Roizen. *J. Appl. Chem. U.S.S.R.* 25, 531-41 (1952) (Engl. translation).—See  
*C.A.* 48, 969g. H. L. H.

ROYZEN, A Ya.

3

Hydraulic and ceramic properties of alumina cements with a high alumina content. G. W. Kukulev and A. Ya. Roizen (*Silikat Tech.*, 1953, 4, 267).—Systematic investigations of the system  $\text{CaO}-\text{Al}_2\text{O}_3-\text{SiO}_2$  by melting and sintering led to the development of cements containing  $\text{Al}_2\text{O}_3$ , 60–70 and  $\text{SiO}_2$ , 2–6%. They consist mainly of  $\text{CaO}, 2\text{Al}_2\text{O}_3$  and  $\text{CaO}, \text{Al}_2\text{O}_3$ , have high refractoriness and refractoriness under load, and show only a slight loss in strength at the critical temp., a slight shrinkage, and a low thermal expansion. Good refractory concretes were made with the cements.

BRIT. CERAM. ABSTR. (C).

PA 52/49T38

USSR/Engineering  
Refractories  
Refractory Materials

Feb 49

"Concrete Refractories With Increased Fire-Resistant Properties," Prof G. V. Kukolev, Dr. Tech Sci, A. I. Royzen, Grad Stud, 8 pp

"Ogneupory" No 2

Fire-resistant concrete manufactured with aluminum cements has a very high fire-resistant quality. However, it cannot be used efficiently at temperatures above 1,250°. Conducted tests with batches containing 60-70% Al<sub>2</sub>O<sub>3</sub> and 6-8% SiO<sub>2</sub>, which gave good performance at temperatures as high

FDD

52/49T38

USSR/Engineering (Contd.)

Feb 49

as 1,500°. Urges further research on cement fire-resistant products.

FDD

52/49T38

ROYZEN, A. I.

Concrete refractories with increased fire properties

"Concrete refractories with increased fire properties"

Ggneupory, No. 2, 1949

ROIZEN, A. I.

RESEARCH LITERATURE CLASSIFICATION

RESEARCH LITERATURE CLASSIFICATION

**Refractory concrete with improved firing properties.**  
G. V. KRUKOV AND A. I. ROIZEN, *Ogneuproy*, 14 (21) 65-76 (1949). (1) *Ca aluminates and experimental cements.* Synthetic minerals and experimental cements were prepared by fusing mixtures of technical alumina,  $\text{CaCO}_3$ , and amorphous  $\text{SiO}_2$  in a crucible in an electric furnace. The product of each fusion was studied to determine its structure and its hydraulic, mechanical, and thermal properties. The presence of  $(\text{CaO})_2(\text{Al}_2\text{O}_3)_3$  in cement for refractory concretes is considered harmful because of very rapid setting, high firing shrinkage, low temperature of deformation under load, and noticeable drop in mechanical strength after firing. Smallest volume variations and satisfactory hydraulic properties were shown by  $\text{CaO} \cdot (\text{AlO})_3$ . With regard to temperature of deformation under load and hydraulic properties,  $\text{CaO} \cdot \text{Al}_2\text{O}_3$  and  $\text{CaO} \cdot (\text{AlO})_3$  were alike, but the former had a residual shrinkage of 3% after firing at  $1300^\circ\text{C}$ , and the latter only 0.21%. The experimental cements had 55 to 70%  $\text{Al}_2\text{O}_3$  and 2 to 8%  $\text{SiO}_2$ . In general, the strength of the cements dropped with increasing  $\text{SiO}_2$  content, particularly above 1%. Setting was delayed with increasing content of  $\text{Al}_2\text{O}_3$ . The compressive strength varied from 53 to 220  $\text{kg}/\text{cm}^2$ . Firing to  $1000^\circ$  did not, as a rule, cause a reduction in strength; with increasing temperature, the strength of all

hydrated cements increased. During firing at  $1100^\circ$ , the cement containing 55%  $\text{Al}_2\text{O}_3$  fused over and leached; cements with higher  $\text{Al}_2\text{O}_3$  contents showed no signs of frothing. Refractoriness of the cements ranged from  $1400^\circ$  to  $1700^\circ$  and increased with alumina content. For  $\text{Al}_2\text{O}_3$  contents of 60% and higher, the refractoriness increased with the addition of  $\text{SiO}_2$ . For a constant  $\text{SiO}_2$  content, the temperature of deformation under load increased with the  $\text{Al}_2\text{O}_3$ ; with increasing  $\text{SiO}_2$  the deformation temperature dropped, but for 6 to 8%  $\text{SiO}_2$  it rose again. Thermal expansion was practically the same for temperatures up to  $1100^\circ$ , but above that there was a sharp shrinkage for cements containing 55%  $\text{Al}_2\text{O}_3$ . Two cements were prepared for tests in refractory concretes: (a) 68%  $\text{Al}_2\text{O}_3$  + 2%  $\text{SiO}_2$  and (b) 68%  $\text{Al}_2\text{O}_3$  + 6 to 8%  $\text{SiO}_2$ . The chief component of these cements was  $\text{CaO} \cdot (\text{AlO})_3$ .  $\text{CaO} \cdot \text{Al}_2\text{O}_3$  and goethite were present in small amounts. In cements containing 6 to 8%  $\text{SiO}_2$ , corundum grains were also observed. In addition to fused cements, sintered cements of the same composition were prepared. The properties of the sintered products were found to be equal to those of the fused cements. (2) *Refractory concretes.* Fused cements containing 68  $\text{Al}_2\text{O}_3$ , 30  $\text{CaO}$ , and 2%  $\text{SiO}_2$  were used in concrete tests with various fillers. The amount of cement varied from 10 to 20% and the cement/water ratio from 1.43 and to 2.14. No drop in strength was ob-

KUKOLEV, G. V., ROYZEN, A. I.

Cement

Binding and ceramic characteristics of alumina-containing cements with a high Al<sub>2</sub>O<sub>3</sub> content. Zhur. prikl. khim. 25 no. 5 (1952)

9. Monthly List of Russian Accessions, Library of Congress, August 1952. Unclassified.

ROYZEN, A-Ya.

354. Hydraulic and ceramic properties of alumina cements with a high  $Al_2O_3$  content. — G. V. Kuzoley and A. Ya. Royzen (*Silikat. Tech.*, 4, 267, 1953). The object was to develop suitable  $Al_2O_3$  cements which, when mixed with aluminous aggregates, could replace refractory bricks. Systematic investigations of the system  $CaO-Al_2O_3-SiO_2$  by melting and sintering led to the development of cements containing 60–70%  $Al_2O_3$  and 2–6%  $SiO_2$ . They consist mainly of  $CaO \cdot 2Al_2O_3$  and  $CaO \cdot Al_2O_3$ , have high refractoriness and R.v.L. and show only a slight loss in strength at the critical temp., a slight shrinkage and a low thermal expansion. Good refractory concretes were made with these cements. (8 figs., 2 tables.)

ROYE, I.S., Inzh.; TERNOV-TROP, I.K., Inzh.

Operation of low-power asynchronous motors. Energetik. 13 no.4:21-22  
Ap '65. (MIRA 18:6)

KARMAZIN, V.I., doktor tekhn. nauk; ROYZEN, I.D.

New method of beneficiating oxidized quartzites. Met. i  
gornorud. prom. no.3:58-60 My-Je '65. (MIRA 18:11)

KARMAZIN, V.I., prof.; ROYZEN, I.D., inzh.; BINKEVICH, V.A., inzh.

Flow sheets of ore dressing plants in the Krivoy Rog iron ore and  
Nikopol' manganese basins. Gor. zhur. no.9:61-64 S '65. (MIRA 18:9)

1. Dnepropetrovskiy gornyy institut (for Karmazin, Royzen).
2. Pridneprovskiy sovet narodnogo khozyaystva (for Binkevich).

A. Royzen  
AUTHOR: Kireyev, M.I., Engineer

94-4-17/25

TITLE: Scientific-technical Conference on Problems of Static Electricity (Nauchno-tekhnicheskoye soveshchaniye po bor'be so staticheskim elektrichestvom)

PERIODICAL: Promyshlennaya Energetika, 1958, Vol.13, no.4, pp. 32 - 38 (USSR).

ABSTRACT: The Central Management of the All-Union Chemical Society imeni D.I. Mendeleev (Vsesoyuznoye khimicheskoye obshchestvo imeni D.I. Mendeleeva), together with the Ministry of the Chemical Industry of the USSR (Ministerstvo khimicheskoy promyshlennosti SSSR), called a scientific-technical conference on problems of static electricity. The conference met in Moscow on December 16 - 18, 1957 and six reports were read. Prof. I.S. Royzen gave a mainly theoretical report on static electricity and methods of dealing with it. Candidate of Technical Sciences V.S. Medvedeva dealt with the ionisation of air by means of radio-active substances. Engineer A.V. Belotsvetov described the construction of radio-active ionisers. Senior Scientific Assistant Borisov indicated present practice in lightning protection. A proposed standard for protection against static electricity and secondary effects of lightning

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Scientific-technical Conference on Problems of Static Electricity 94-4-17/25

was described by B.L. Kaner.

The conference showed that methods of dealing with static electricity have not yet been sufficiently studied. The addition of conductive substances to insulating materials can reduce their potential. Radio-active substances can be helpful when other methods fail.

The conference decided to ask the appropriate authorities to establish the static electricity characteristics of a number of substances and to determine the humidity required in the atmosphere to avoid danger from static. The Scientific Research Institute of the rubber industry should develop conductive rubbers. The use of radio-active substances for volume ionisation needs investigation and thermal ionisers should be studied and manufactured.

AVAILABLE: Library of Congress  
Card 2/2

MEDVEDEVA, V.S.; ROZLOVSKIY, A.I.; ROYZEN, I.S.

Investigating the explosion hazard of combustible mixture  
formed in the synthesis of xanthogenates. Khim.prom.  
no.4:330-332 Je '60. (MIRA 13:8)  
(Xanthates) (Explosions)

ROYZEN, I.I.; CHERNAVSKIY, D.S.

Interference between the amplitudes of inelastic processes  
[with summary in English]. Zhur. eksp. i teor. fiz. 42 no.2:  
625-629 F '62. (MIRA 15:2)

1. Fizicheskiy institut imeni Lebedeva AN SSSR.  
(Mesons—Scattering) (Nucleons)

ROYZEN, I.I.; CHERNAVSKIY, D.S.

Relation between various methods for describing the interaction  
of high-energy particles. Zhur. eksp. i teor. fiz. 44 no.6:  
1907-1914 Je '63. (MIRA 16:6)

1. Fizicheskiy institut im. P.N. Lebedeva AN SSSR.  
(Collisions(Nuclear physics))

DREMIN, I.M.; ROYZEN, I.I.; UAYT, R.B.; CHERNAVSKIY, D.S.

The Bethe-Salpeter equation and the significance of "central" interactions. Zhur. eksp. i teor. fiz. 48 no.3:952-964 Mr '65.  
(MIRA 18:6)

1. Fizicheskiy institut imeni Lebedeva AN SSSR.

S/064/61/000/009/002/002  
B110/B101

AUTHORS: Petrovskiy, Yu. V., Fastovskiy, V. G., Royzen, I. I.  
TITLE: Use of finned pipes in crosscurrent exchangers with spirals  
PERIODICAL: Khimicheskaya promyshlennost', no. 9, 1961, 58 - 63

TEXT: The present paper deals with heat exchange, hydraulic resistance, and efficiency of finned pipes in heat exchangers used for air fractionation. The authors used tempered copper pipes, 8 - 15 mm in diameter, with transverse fins arranged in spirals, which were obtained by plastic deformation by means of rolling. Rolling rate: 15 - 20 m/hr; pipe length: 20 m; inside diameter  $d_i$ : 4.7 mm; diameter of fin basis: 6.1 mm; outside fin diameter:  $D = 10.7$  mm; mean fin thickness:  $\delta = 0.38$  mm; fin height:  $h = 2.3$  mm; number of fins per meter: 625; fin spacing:  $t = 1.6$  mm; specific external pipe surface:  $F = 0.0965$  m<sup>2</sup>/m; coefficient for calculating the surface of the finned pipe:  $\eta = F/F_{(sm.p.)} = 5.05$ ; ( $F_{sm.p.}$  = specific surface of smooth pipe, diameter = 6.1 mm); weight of pipe:  $W = 0.215$  kg/m. The tempered pipe can be wound round a 40 - 50 mm

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diameter core and serves for high-pressure heat exchangers ( $150-200 \text{ kg/cm}^2$ ) (admissible internal excess pressure =  $400 \text{ kg/cm}^2$ ). The pipes (2) were wound round a brass pipe core (1) (Fig. 2) with an outside diameter of 100 mm, in four layers without space linings. The sense of winding alternated. Number of turns in the direction of the air current: 24 per layer; interstice  $\approx 11.2 \text{ mm}$ ; space between fin edges: 0.5 mm. They are covered with felt (3) and coated with a 1 mm Cu foil (4). Four guiding surfaces provide good air distribution. The heat exchanger is 900 mm long, its outside diameter is 195 mm. The total length of pipes is 43.4 m, their external surface:  $4.18 \text{ m}^2$ . A high-pressure fan (1) (Fig. 3) and an electric heater (2) are used for pumping air into the heat exchanger (3) from which cooled air is conducted through a pipe (4) (100 mm in diameter) with a diaphragm (5), a differential pressure gauge (6), and a simple water gauge (7) for measuring air consumption. A centrifugal pump (9) served for pumping cold water through an intermediate vessel (8) into vessel (3), and warm water into measuring vessel (10). (11) and (12) are differential water gauges. (11) indicates the drop in pressure of the air passing through (3), (12) indicates the pressure difference between inlet and outlet pipes of (3). Inlet and outlet temperatures were measured by the copper-

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constantan thermocouples  $T_1$  and  $T_2$ , the temperature of water by  $T_3$  and  $T_4$ . The differential thermocouple  $T_5 - T_5'$  determined the difference in the temperatures of  $H_2O$  and air in the lower part of (3). The Hg thermometer  $T_6$  measured the air temperature behind (5). The consumption of air and water was controlled and periodically measured by sluice valves inserted into suction and pressure pipes, and by valves between (8) and (9), respectively. The exchanged heat amount  $Q$  was determined from temperature, water and air consumption. Heat exchange coefficient of the finned surface:  $\alpha = 0.133 \lambda (W \cdot d_{out}/\nu)^{0.89}/d_{out}$ ;  $\lambda$  = thermal conductivity of air;  $d_{out}$  = outside diameter of pipe;  $W$  = velocity of air flow;  $\nu$  = kinematic viscosity; pressure drop:  $\Delta p = 10 m(\gamma \cdot W^2) g Re^{-0.27}$ , where  $m$  is the number of turns in the direction of air flow, and  $\gamma$  is the air density. In liquid and high-pressure heat exchangers, the reduction of weight is 65 - 70% due to the use of the above pipes. In medium-pressure gas heat exchangers it is 53 - 58% (saving general t of Cu per oxygen plant). It would be better to use 10.1.5 mm pipes for the latter, and 12.2 mm pipes for undercooling

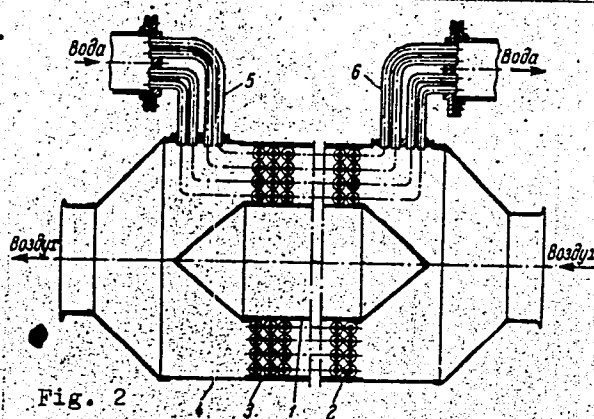
Card 3/5

Use of finned pipes in...

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B110/B101

systems.  $Nu = 0.093 \cdot Re^{0.89}$  holds for pipes with  $D = 13$  mm, and  
 $Nu = 0.148 \cdot Re^{0.89}$  holds for pipes with  $D = 18$  mm. The number of pipes used in  
gas heat exchangers and liquid undercoolers can be reduced to 30-40%, and  
their weight to 35-50%. There are 3 figures, 3 tables, and 4 Soviet  
references.

Fig. 2: Test heat exchanger.



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WIS, V.D.; POPOV, B.G.; ROYZEN, I.S.

Classification of plastics in pneumatic conveying systems.  
Plast. massy no.2:62-66 '66.

(MIRA 19:2)

S/064/60/000/004/015/021/XX  
B013/B063

AUTHORS: Medvedeva, V. S., Rozlovskiy, A. I., Royzen, I. S.  
TITLE: Explosiveness of Combustible Mixtures Formed During the  
Synthesis of Xanthates

PERIODICAL: Khimicheskaya promyshlennost', 1960, No. 4, pp. 66-68

TEXT: The authors have studied the limits of applied ignition for air - gas mixtures formed during the synthesis of xanthates. The purpose of the present work was to determine the limits of the permissible explosion-proof dilution of these products with air, and to obtain data on the ignition temperature of liquid reaction products. The limits of applied ignition were determined by means of the device shown in Fig. 1. The mixtures to be tested were ignited in a spherical steel bulb (Fig. 1,1) with a capacity of 6.2 l at a pressure of 1 atm. Ignition took place in the middle of the bulb with the help of an aircraft spark-plug (2) which was screwed into the bulb. The process was visually observed through a slot covered with a plexiglass or glass plate. The bulb could be

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Explosiveness of Combustible Mixtures  
Formed During the Synthesis of Xanthates

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externally heated up to 100°C. It was heated to the temperature required for the tests, after which it was evacuated through valve (5) and purified with air through valve (6). The fuel-water mixture was likewise introduced through (6). Three series of tests were made with fuel mixtures of different compositions. The concentration of carbon disulfide ( $\beta$ ) in the test mixtures was varied between 0.5 and 3% by weight. In addition, the mixture contained 62% ethyl alcohol in the first series, 75% n-butyl alcohol in the second, and 75% n-butyl alcohol and 8% benzene in the third. The rest consisted of water. The tests have shown that the minimum explosion-proof concentration of the gaseous components varies from 18 to 33%. The critical concentration of the fuel is hardly affected by carbon disulfide, and in some cases it is even reduced. Thus, it has been found that the gaseous products formed during the synthesis of xanthates permit a dilution with 2-2.5 times the amount of air, allowance being made for a safety margin. A similar behavior of carbon disulfide was observed in other cases. A comparison of the critical compositions indicates that the content of inert components in all mixtures changes only slightly at the limit of applied ignition, i.e., from 64.6 to 67.9%. The coefficients of

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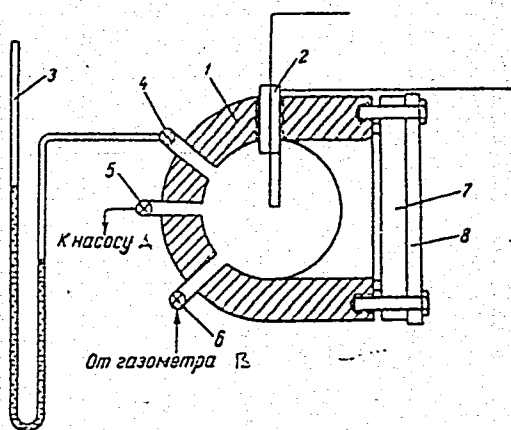
Explosiveness of Combustible Mixtures  
Formed During the Synthesis of Xanthates

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the oxidant excess  $\alpha_{cr}$  are therefore comparable. The effect produced by addition of carbon disulfide upon the combustibility of the mixture can be determined from the dependence of  $\alpha_{cr}$  on  $\beta$ . It is noted that an increase of  $\beta$  has no appreciable effect on the value of  $\alpha_{cr}$ . The ignition temperature of liquid products was determined by means of a device developed by Martens-Penskiy. The results obtained show that the ignition temperature is largely reduced by an increase of the carbon-disulfide content in the test mixture. There are 7 figures and 6 references:  
5 Soviet and 1 US.

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Legend to Fig. 1: 1 - wall;  
2 - aircraft spark-plug;  
3 - pressure gauge; 4, 5, 6 -  
valves; 7 - plexiglass or glass  
plate; 8 - flange; A - to pump;  
B - from gasometer.

Card 4/4

ROYZEN, I.S., professor

Division of safety measures. Khim.nauka i prom. 4 no.6:797  
'59. (MIRA 13:8)  
(Chemical industries--Safety measures)

14-0000

77287

SOV/63-4-6-21/37

AUTHOR: Royzen, I. S. (Professor)

TITLE: The Industrial Safety Section

PERIODICAL: Khimicheskaya nauka i promyshlennost', 1959, Vol 4, Nr 6,  
pp 797 (USSR)

ABSTRACT: The industrial safety section of the All-Union Chemical Society imeni D. I. Mendeleev is presently occupied with the following main problems: static electricity in industry; prevention of explosions; production of safety valves; teaching of safety techniques in schools; transportation of chlorine and ammonia in barrels and tank trucks to eliminate distributing stations.

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Roizen, I. S.

Roizen, I. S.

The safety and fireproofing techniques in the chemical industry. Accepted as a textbook for the Chemical-Technological Advanced Educational Institutions and Faculties. (Tekhnika bezopasnosti i protivopozharnaya tekhnika v khimicheskoi promyshlennosti. Dopushecheno v kachestve uchebnogo posobiia dlia khimiko-tekhnologicheskikh vuzov i fakul'tetov.)

Moscow

State Scientific-Technological Publishing House for Chemical Literature

1951

Available: Harvard University Library

Source: Monthly List of Russian Accessions  
Vol. 4, No. 9, p. 571

ROYZEN, I.S.

Hermetic sealing of equipment - the basis of safety. Zhur. VKHO  
9 no. 3:242-253 '64. (MIRA 17:9)

ROYZEN, I.S., prof.

Static electricity preven'tive agent in explosion protection.  
Bezop. truda v prom. 8 no.9:42-45 S '64 (MIRA 18:1)

1. Kafedra tekhniki bezopasnosti Moskovskogo instituta tekhnicheskoy bezopasnosti.

L-13639-63 EWT(m)/BDS AFFTC/ASD

ACCESSION NR: AP3003120

S/0056/63/044/006/1907/1914

AUTHOR: Royzen, I. I.; Chernavskiy, D. S.

TITLE: On the relation between various methods for describing the interaction of high-energy particle 19

SOURCE: Zhurnal eksper. i teor. fiziki, v. 44, no. 6, 1963, 1907-1914

TOPIC TAGS: high-energy interactions, moving pole method, strip approximation, one-meson approximation

ABSTRACT: The correspondence between the three methods used to describe interactions between elementary high-energy particles (the method of moving poles, the strip approximation, and the one-meson approximation) is investigated. It is demonstrated that the moving-pole and strip approximations are very similar in meaning and in the extent of approximation made, although the former method is more attractive in view of the greater orderliness and clarity of the main premises. It is also demonstrated that at high energies the expression derivable from the one-meson approximation for the elastic scattering amplitude coincides asymptotically with the expression that follows from the moving-pole method, so that the terms neglected in both methods are the same. The results of this

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analysis establish a connection between the moving-pole method and inelastic processes and permits determination of the region of application of the above three methods on the basis of an analysis of the experimental inelastic scattering data. The limitation of the analysis is discussed. In conclusion the authors express deep gratitude to Ye. L. Feynberg for very valuable advice and fruitful discussions. Orig. art. has 4 figures and 25 formulas.

ASSOCIATION: Fizicheskii institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSSR)

SUBMITTED: 04Oct62

DATE ACQ: 23Jul63

ENCL: 00

SUB CODE: 00

NO REF SOV: 011

OTHER: 013

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